PATENT ABSTRACTS OF JAPAN

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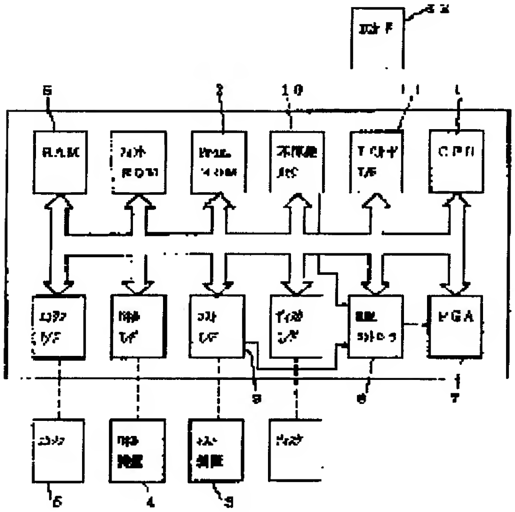
(54) ELECTRONIC EQUIPMENT



(57)Abstract:
PURPOSE: To shorten the time until the use of a device is available after the application of a power source by operating a specific processing at the time of judging that a received command is the command for instructing a writing in a PGA.
CONSTITUTION: At the time of transmitting circuit information from a host device 3 to a printer, and changing the inside circuit of a PGA 7, the command for instructing the writing in the PGA 7 and the circuit information to be written in the PGA 7 are transmitted to the printer. At the time of judging that the command received from the host device 3 is the command for instructing the writing in the PGA 7, a CPU 1 sets a DMA controller 8 so that the subsequent data can be directly written from a host I/F 9 through a DMA controller 8 in the PGA 7. At the time of the end of the writing of the entire data,

the DMA controller 8 reports the end of the circuit change to the CPU 1. Therefore, the CPU 1 can operate an another processing while the circuit is changed and a processing efficiency can be improved.

LEGAL STATUS

[Date of request for examination]

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[Claim(s)]

[Claim 1] It is the electronic instrument which is an electronic instrument which enabled it to change a circuit by writing the circuit information sent from the equipment of a high order in PGA, and is characterized by writing the data received to the host interface using the DMA controller in PGA when it becomes clear that subsequent data are circuit information with the command received from wearing of a high order.

[Claim 2] The electronic instrument characterized by writing in PGA the circuit information which was the electronic instrument which wrote the circuit information memorized to nonvolatile memory in PGA, used the DMA controller and was memorized to nonvolatile memory while the test of PGA under power-on self-test or parts other than the circuit related to it was performed.

[Claim 3] It is equipment which enabled it to emulate the specification which changes with IC cards. It is made to realize the part from which actuation of a circuit differs with a specification by PGA. If the IC card slot is equipped with the IC card when nonvolatile memory is made to memorize the circuit information on each model furthermore and it is put into a power source, while the test of the part which is not related to PGA under power-on self-test and it is performed The electronic instrument characterized by writing the circuit information corresponding to the specification emulated with an IC card in PGA from nonvolatile memory using a DMA controller.

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the electronic instrument which enabled it to change a circuit by writing circuit information in PGA (programmable gate array).

[0002]

[Description of the Prior Art] There is a thing which enabled it to change a circuit in a printer or intelligent KOPIYA - by writing in PGA the circuit information sent from high order equipments read from nonvolatile memory, such as circuit information and a host. He was trying to write conventionally the data which read into CPU the command and the data (circuit information) sent from the equipment of a high order, stored in RAM, read data after [RAM] reception termination, and wrote in PGA, or read into CPU in direct PGA with the equipment which enabled it to change the circuit of equipment by writing in PGA the circuit information sent from the equipment of a high order.

[0003] Moreover, after a power-on self-test etc. was completed, he reads circuit information from nonvolatile memory to CPU, and was trying to write in PGA with the equipment which wrote the circuit information memorized to nonvolatile memory in PGA, if put into a power source. Therefore, with the equipment which enabled it to change a circuit by writing the circuit information sent from the equipment of a high order in PGA, while having received circuit information from wearing of a high order, CPU was not able to perform other processings. With the equipment which wrote the circuit information memorized to nonvolatile memory again in PGA, after switching on a power source before equipment became usable, it took time amount so long.

[0004]

[Objects of the Invention] This invention is made in view of the above, and in the electronic instrument which wrote the circuit information sent from the equipment of a high order in PGA, while having received circuit information from wearing of a high order, CPU aims at solving the trouble that other processings cannot be performed. Moreover, let it be a technical problem to solve the trouble that only the time amount which writes circuit information in PGA after switching on a power source before becoming usable takes time amount too much in the electronic instrument which wrote the circuit information memorized to nonvolatile memory in PGA.

[0005]

[Elements of the Invention] It is characterized by for this application the 1st invention to write the data received to the host interface in direct PGA using a DMA controller, when it becomes clear that subsequent data are circuit information with the command received from wearing of a high order in the electronic instrument which enabled it to change a circuit by writing the circuit information sent from the equipment of a high order in PGA in order to attain the above-mentioned purpose. In the electronic instrument which wrote the circuit information memorized to nonvolatile memory in PGA, this application 2nd invention is characterized by using a DMA controller and writing the circuit information memorized to nonvolatile memory in PGA, while the test of PGA under power-on self-test or parts other than the circuit related to it is performed.

[0006]

[Example] Next, one example of this invention is explained using drawing. Drawing 1 is the explanatory view showing the configuration of the controller of a laser beam printer. In drawing, 1 is CPU which controls each part of a controller, the engine 5 of a printer, etc. according to the command from the program stored in the program ROM 2, host equipment 3, and panel equipment 4. RAM by which 6 is used for the work-piece memory of CPU1, the input buffer of input data, the page buffer of print data, a download font memory, etc., PGA which can reconfigurate an internal circuitry when 7 writes in circuit information, the DMA controller which performs data transfer 8 does not mind CPU1, and 9 are the host interfaces for performing a communication link with host equipment 3. Usually, Centronics, RS232C, the nonvolatile memory in which 10 stores circuit information, and 11 are the IC card interfaces for performing the read-out writing of data to IC card 12 which can be detached and attached freely.

[0007] In the above-mentioned configuration, when sending circuit information to a printer from host equipment 3 and changing the internal circuitry of PGA7, the circuit information written in the command which directs the writing to PGA, and PGA as usual is transmitted to a printer. If CPU1 turns out for the command received from host equipment 3 to be a command which directs the writing to PGA, it will set up DMA controller 8 so that subsequent data may be directly written in PGA7 through DMA controller 8 from host I/F9. After the writing of all data is completed, DMA controller 8 reports termination of circuit modification to CPU1.

[0008] Moreover, at the time of the volatilization memory in which memory holding the circuit information inside PGA7 cannot hold data unless the power source is supplied, nonvolatile memory 10 is made to memorize circuit information, and while the test of the part which is not related to PGA under power-on self-test and it is performed, the circuit information on nonvolatile memory 10 is written in by PGA7 through DMA controller 8.

[0009] Furthermore, it is made to realize the part (for example, timing of a centronics interface) from which actuation of a circuit differs with a specification by PGA7, and the circuit information for constituting the circuit of each model in nonvolatile memory 10 further is made to memorize with the equipment which enabled it to emulate the specification which changes with IC cards 12. And if the IC card slot is equipped with IC card 12 when put into a power source, while the test of the part which is not related to PGA under power-on self-test and it is performed, the circuit information corresponding to the specification emulated with IC card 12 is written in PGA7 from nonvolatile memory 10 using DMA controller 8.

[0010]

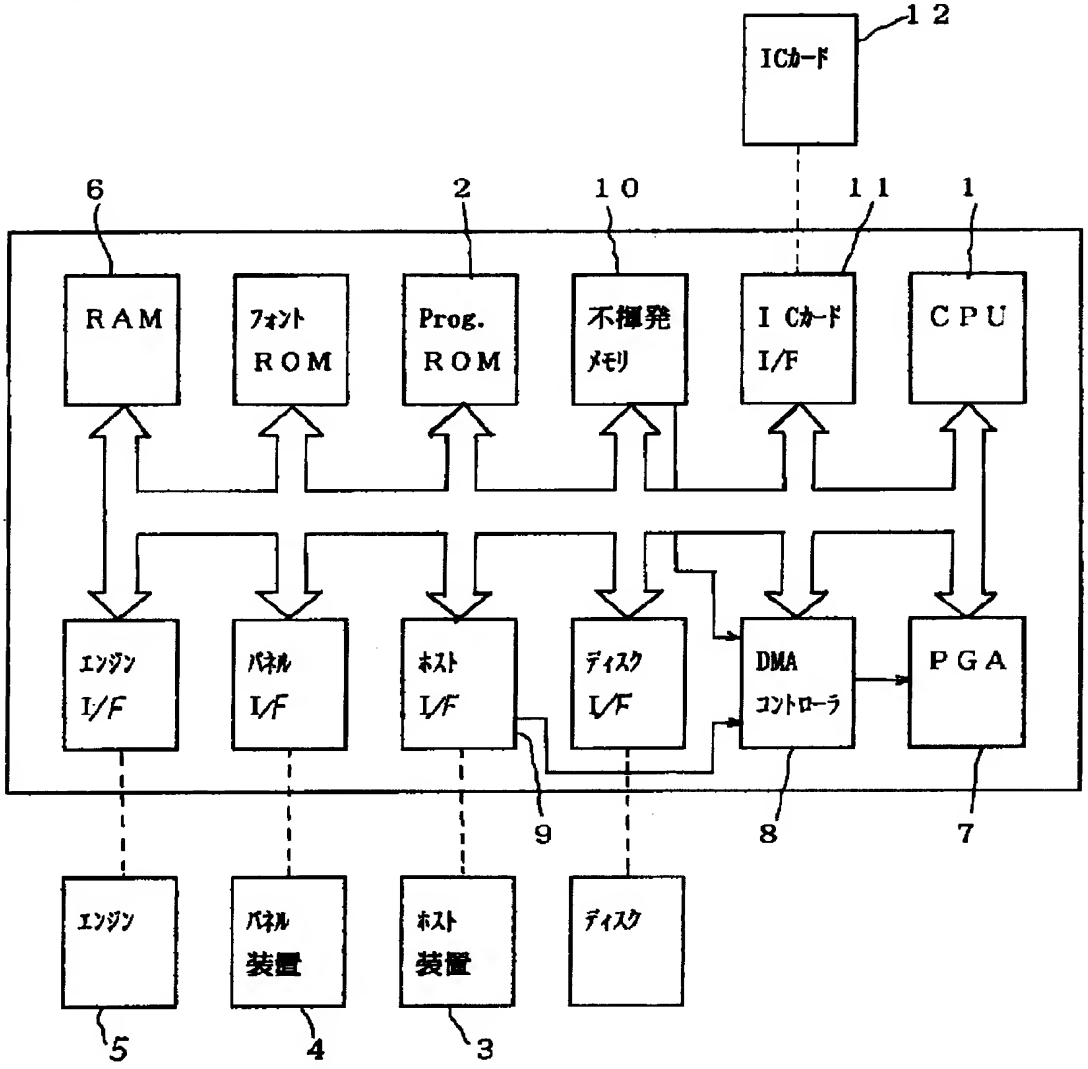
[Effect of the Invention] When changing the internal circuitry of PGA using the circuit information sent from the equipment of a high order, this invention The circuit information written in the command which directs the writing to PGA, and PGA is transmitted. Since subsequent data use a DMA controller for PGA and were directly written in it from host I/F when the received command turned out to be the command which directs the writing to PGA While a circuit change is made, CPU can perform other processings and its processing effectiveness improves.

[0011] At moreover, the time of the volatilization memory in which memory holding the circuit information inside PGA cannot hold data unless the power source is supplied While the test of the part which nonvolatile memory is made to memorize circuit information and is not related to PGA under power-on self-test and it is performed Since the circuit information on nonvolatile memory was written in PGA through the DMA controller, time amount after switching on a power source until equipment becomes usable is shortened.

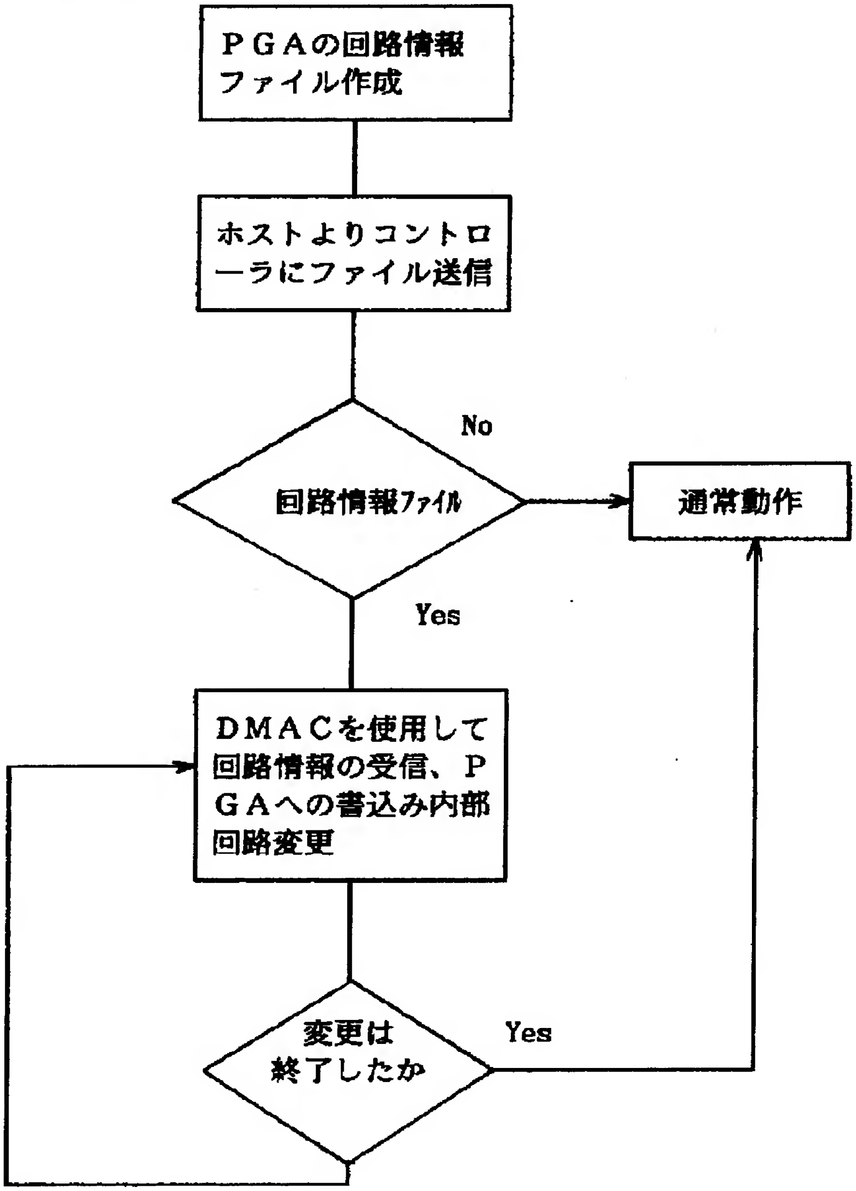
[0012] In the equipment which enabled it to emulate the specification which furthermore changes with IC cards It is made to realize the part from which actuation of a circuit differs with a specification by PGA7. Nonvolatile memory is made to memorize the circuit information for constituting the circuit of each model furthermore. If the IC card slot is equipped with the IC card when put into a power source, while the test of the part which is not related to PGA under power-on self-test and it is performed, with an IC card Since the circuit information corresponding to the specification emulated was written in PGA through the DMA controller from nonvolatile memory, time amount after an emulation becomes easy and switching on a power source until equipment becomes usable is shortened.

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the configuration of the controller of the laser beam printer of one example of this invention.
[Drawing 2] It is the flow chart showing the procedure for changing the internal circuitry of delivery PGA into the printer of the example of drawing 1 for circuit information from host equipment.
[Drawing 3] It is the flow chart showing the procedure for writing the circuit information corresponding to the specification emulated with an IC card in PGA through a DMA controller from nonvolatile memory.
[Description of Notations]
1CPU, 2 ROM, 3 Host equipment, 4 Panel equipment, 5 An engine, 6 RAM, 7 PGA, 8 A DMA controller, 9 A host interface, 10 Nonvolatile memory, 11 IC card interface

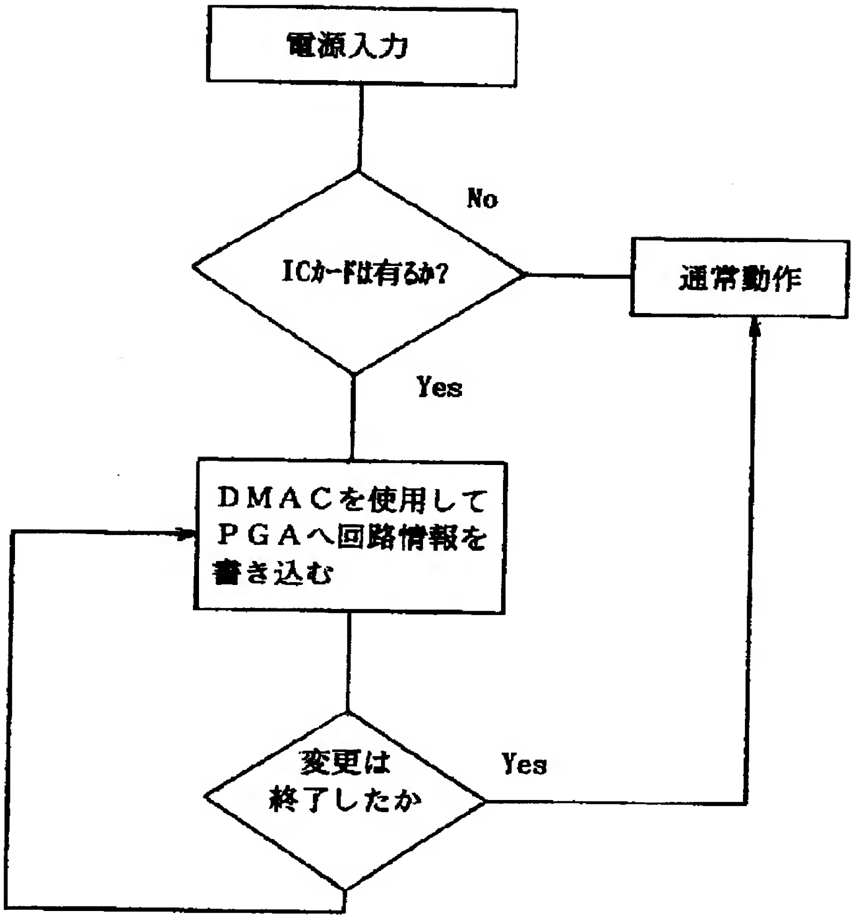
[Drawing 1]


ICカード
12
6
2
10
11
1
RAM
フォント ROM
Prog. ROM
不揮発 メモリ
I Cカード I/F
CPU
エンジン I/F
パネル I/F
ホスト I/F
ディスク I/F
DMA コントローラ
PGA
9
8
7
エンジン
パネル 装置
ホスト 装置
ディスク
5
4
3

[Drawing 2]


ＰＧＡの回路情報ファイル作成
ホストよりコントローラにファイル送信
回路情報ﾌｧｲﾙ
No
通常動作
Yes
ＤＭＡＣを使用して回路情報の受信、ＰＧＡへの書込み内部回路変更
変更は終了したか
Yes

[Drawing 3]


電源入力
ICカードは有るか?
No
通常動作
Yes
DMACを使用してPGAへ回路情報を書き込む
変更は終了したか
Yes

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